TAMK
Masters' Conference
Biobased Future

Martin à Porta

The World in 2018
7.8 billion people

1 in 12 over 65 years	**55%** living in urban areas
1.9 billion population living under water stress	**31%** forests cover land area
20 MWh energy consumption / capita	**330 Mt** plastics produced p/a = 825 Mt CO2 / e
8.4 billion connected devices (IOT explosion)	**AI & machine learning** increased optimisation, efficiency & new jobs

The World in 2048
9.6 billion people

1 in 6 over 65 years	**66%** living in urban areas
3.9 billion population living under water stress	**39%** forests cover land areas
100% increase in energy prod. (1/3 for transportation)	**Biomaterials** proliferation of bio-based innovation, plastics substitution etc.
100 billion connected devices IOT surge continues	**Digital representations** of most aspects of our world (MR), connected dynamically by real-world counterparts...

Threats and related opportunities

ENVIRONMENT CONSCIOUSNESS

SURGING POPULATION AND URBANIZATION

Threats to opportunities

DIGITALIZATION AND TECHNOLOGICAL ADVANCES

CLIMATE CHANGE

DECLINING NATURAL RESOURCES

URGENCY TO DESIGN SUSTAINABLE SOLUTIONS

CHANGING CONCEPT OF OWNERSHIP

Circular Economy

WHAT DRIVES CIRCULAR ECONOMY?

– Over consumption of natural resources

– New generations of consumers

– Urbanization

– Tightening legislation

– Technological advancement & digitalization

WHAT NEEDS TO HAPPEN?

– Strong leadership in governments and large businesses to step out of the comfort zone and change the political and business environment

– Stepping out of the comfort zone in design and planning – we need to plan things differently, to design waste out

– Traditional linear business models need to be changed to circular business models

– Innovation and use of enablers via technological development

4th Industrial Revolution

SIMULTANEOUS REVOLUTIONS

- Digital technologies revolution with A.I. as one spearhead

- Materials revolution with e.g. graphene as an example

- Mutual enabling – "braided revolutions"

- Digital platforms enable development of new materials

- New materials enable faster and smaller digital platforms and better hardware for digital tech

- An evolutionary spiral of mutually reinforcing revolutions

CHALLENGES AND OPPORTUNITIES

- With deep specialization, very few people understand even a fraction of the new technologies

- Putting together the new inventions like "lego blocks" into even more fantastic creations is possible, if you know what blocks you have at your disposal

- Again, digitalization can help us keep track of and combine the digital and material innovations

- One big challenge: if only the machines understand the new technology, are we back to medieval times, using "magic" boxes without understanding them
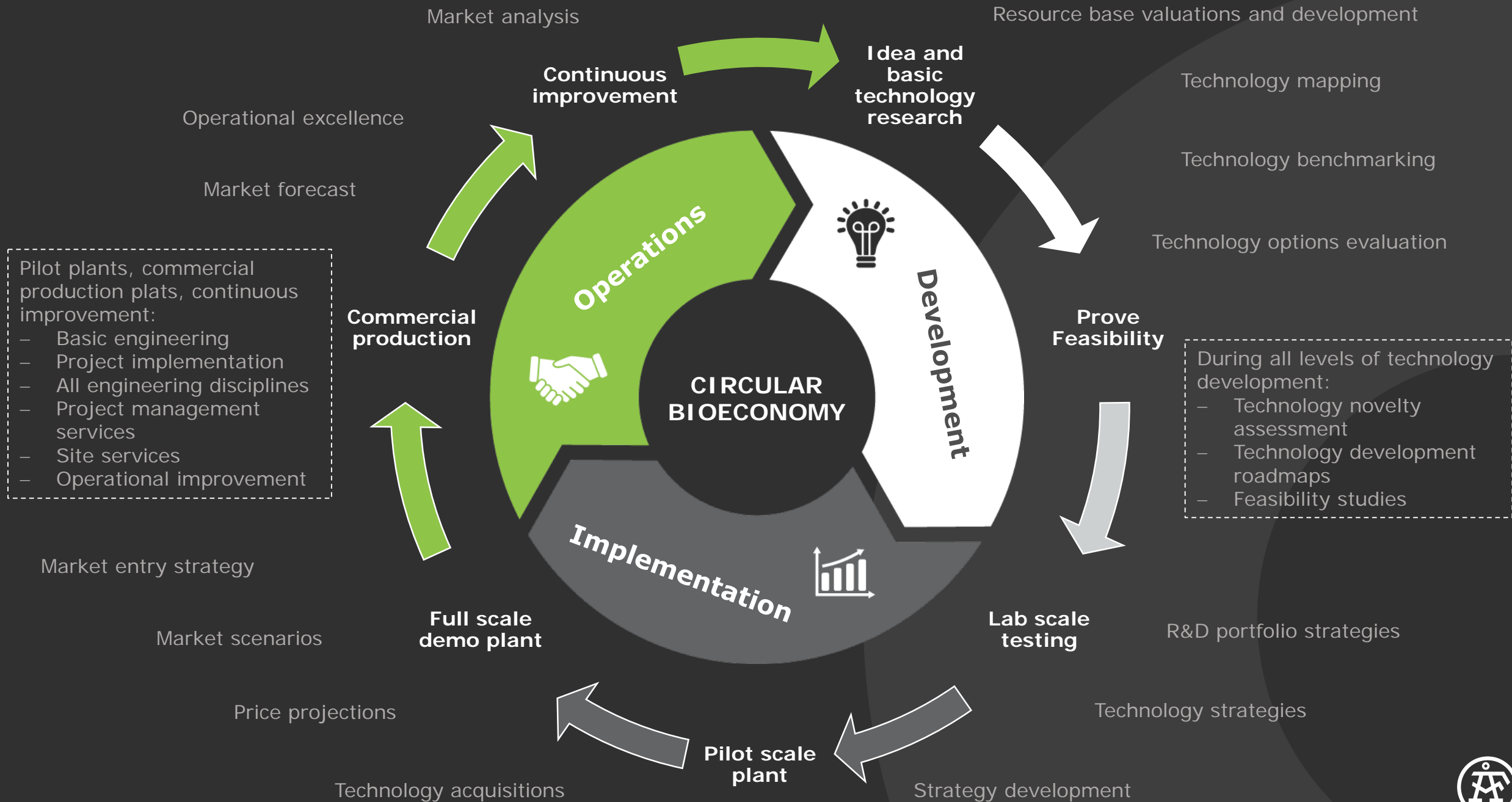
Circular Bioeconomy

WHAT DOES THIS MEAN?

– Circular economy and bioeconomy are strongly linked together

– By extending the lifetime of products and recycling materials, a circular, bio-economy approach can help retain material value for longer time

– With bio based production we can decrease the environmental harm non-renewable production fossil-based economy causes

CHALLENGES AND DRIVERS

– Bioeconomy can be quite resource intensive and increasing demand for food, biomaterials and bioenergy resources could worsen the over-exploitation of natural resources

– Traditional linear business models need to be changed to circular business models and industrial symbiosis is an important element

– There are several drivers towards circular bioeconomy - including strong policy measures

Market analysis

Resource base valuations and development

Continuous improvement

Idea and basic technology research

Operational excellence

Technology mapping

Market forecast

Technology benchmarking

Operations

Development

Technology options evaluation

Pilot plants, commercial production plats, continuous improvement:
– Basic engineering
– Project implementation
– All engineering disciplines
– Project management services
– Site services
– Operational improvement

Commercial production

Prove Feasibility

CIRCULAR BIOECONOMY

During all levels of technology development:
– Technology novelty assessment
– Technology development roadmaps
– Feasibility studies

Market entry strategy

Implementation

Full scale demo plant

Lab scale testing

R&D portfolio strategies

Market scenarios

Price projections

Technology strategies

Pilot scale plant

Technology acquisitions

Strategy development

Your ideas matter

- Young people joining the business world have a **greater opportunity than ever before to effect change** and drive companies towards a more sustainable future

- **Students have the power** to lead a consultancy company forward with fresh ideas

- To leverage the power of **innovative thinking and social media**, go ahead and share your idea with me via Twitter, LinkedIn or Instagram

- You will be invited to discuss your idea with my **team of experts** and we will write a LinkedIn article about it

- **So here's to the challenge....**

Sahara Reforestation

– Sahara reforestation is quite topical question at the moment in Finland

– ÅF Pöyry has a world-class forestry knowledge and we are currently planning and building a seawater desalination plant in Saudi-Arabia

– **What is your idea that will enable the Sahara Reforestation vision to become reality?**

– Share your ideas with me via social media:

  – Twitter: **@Martin_aPorta**

  – LinkedIn: **www.linkedin.com/in/martinaporta**

  – Instagram: **martin.aporta**

Win-win-win

Future industry has the potential to benefit all parties...

- Companies can profit because waste generates value

- Individuals can benefit from a more profitable economy

- Future generations can benefit from a protected global environment

So there is even more opportunity for the creative minds at TAMK to put together amazing tools that can truly solve global problems
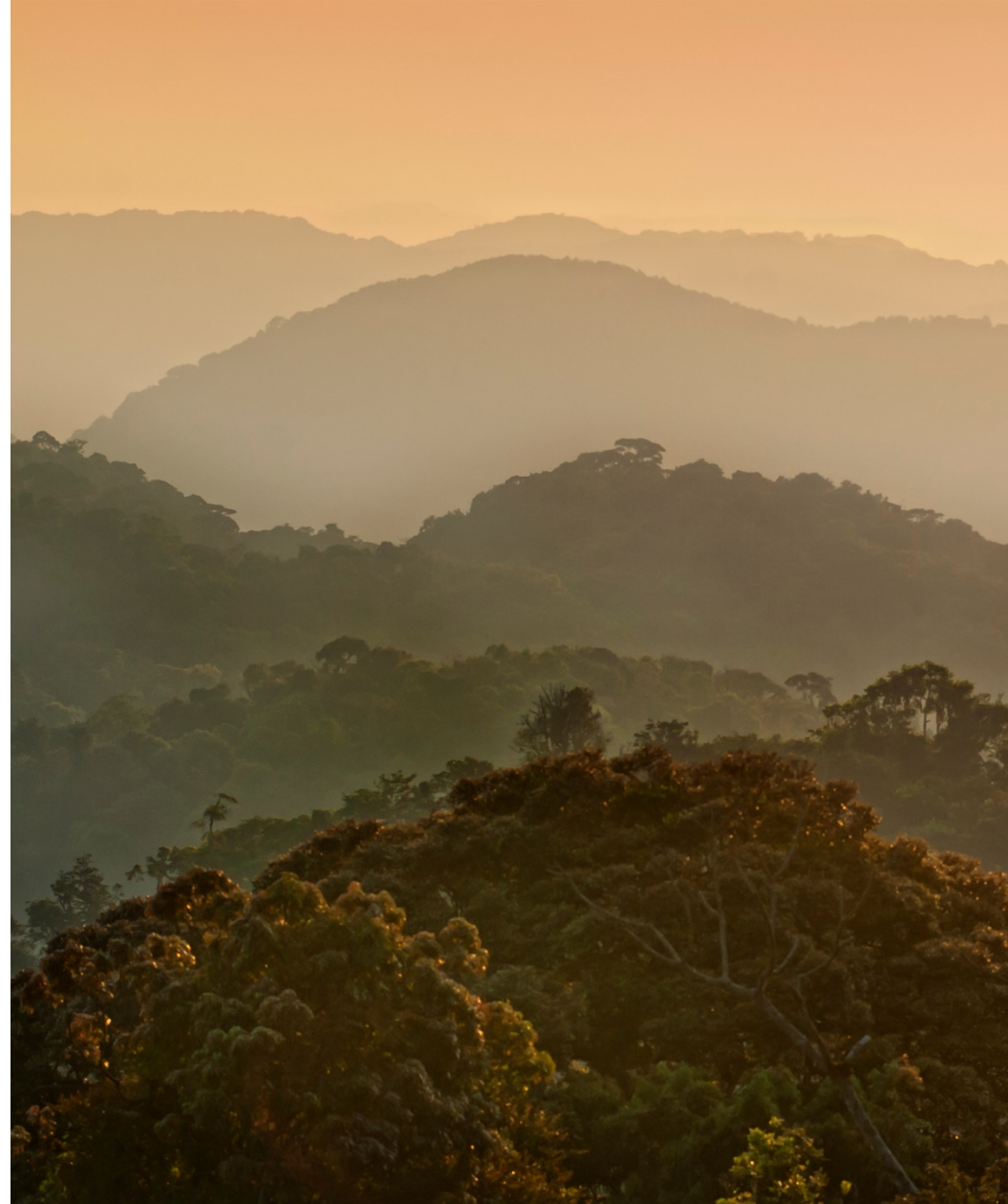
Innovation is the specific instrument of entrepreneurship. The act that endows resources with a new capacity to create wealth.

- Peter Drucker

Making Future.